

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (Original) A cleaning nozzle comprising:

an ejection nozzle portion having a minimum diameter portion and a trumpet-shaped portion formed by multiple inclined portions located upstream of said minimum diameter portion;

a gas ejection port formed along said multiple inclined portions and opened to an intermediate part of said trumpet-shaped portion;

another inclined portion having its inclination angle with respect to an axis of said ejection nozzle portion smaller than an ejection angle of said gas ejection port and interposed between said gas ejection port and said minimum diameter portion; and

a cleaning liquid ejection port formed inside said gas ejection port;

whereby a gas is ejected from said gas ejection port at a speed higher than that of a cleaning liquid from said cleaning liquid ejection port to transform the cleaning liquid into droplets and to accelerate them.

2. (Original) A cleaning nozzle according to claim 1, wherein a gas jet flow passing through a central part of said gas ejection port converges at a point upstream of said minimum diameter portion.

3. (Original) A cleaning nozzle according to claim 1, wherein a cross-sectional area of said gas ejection port perpendicular to a direction of its axis is progressively reduced toward its downstream open end to accelerate the gas.

4. (Original) A cleaning nozzle according to claim 1, wherein a cross-sectional area of said gas ejection port at its downstream open end is set almost equal to or slightly smaller than that of said minimum diameter portion.

5. (Original) A cleaning nozzle according to claim 1, wherein a ratio between a cross-sectional area of said gas ejection port at its downstream open end and a cross-sectional area of the minimum diameter portion is set to 1:1 to 1:1.3.

6. (Original) A cleaning nozzle according to claim 1, wherein a distance from said cleaning liquid ejection port to a downstream end of said ejection nozzle portion is 10-50 times a diameter of said minimum diameter portion.

7. (Original) A cleaning nozzle according to claim 1, wherein a powder material can be supplied to an upstream side of said gas ejection port.

8. (Currently Amended) A cleaning nozzle comprising: an ejection nozzle portion having a minimum diameter portion and a trumpet-shaped portion formed by a curved surface located upstream of said minimum diameter portion, an inclination angle of a tangent to the curved surface progressively decreasing toward said minimum diameter portion; a gas ejection port formed along the curved surface and opened to an intermediate part of said trumpet-shaped portion; and a cleaning liquid ejection port formed inside said gas ejection port; whereby a gas is ejected from said gas ejection port at a speed higher than that of a cleaning liquid from said cleaning liquid ejection port to transform the cleaning liquid into droplets and to accelerate them, wherein a tapered portion is formed on an outer surface of the cleaning liquid ejection port.

9. (Currently Amended) ~~A cleaning nozzle according to claim 8~~ A cleaning nozzle comprising: an ejection nozzle portion having a minimum diameter portion and a trumpet-shaped portion formed by a curved surface located upstream of said minimum diameter portion, an inclination angle of a tangent to the curved surface progressively decreasing toward said

minimum diameter portion; a gas ejection port formed along the curved surface and opened to an intermediate part of said trumpet-shaped portion; and a cleaning liquid ejection port formed inside said gas ejection port; whereby a gas is ejected from said gas ejection port at a speed higher than that of a cleaning liquid from said cleaning liquid ejection port to transform the cleaning liquid into droplets and to accelerate them,

wherein a gas jet flow passing through a central part of said gas ejection port converges at a point upstream of said minimum diameter portion.

10. (Original) A cleaning nozzle according to claim 8, wherein a cross-sectional area of said gas ejection port perpendicular to a direction of its axis is progressively reduced toward its downstream open end to accelerate the gas.

11. (Currently Amended) ~~A cleaning nozzle according to claim 8~~ A cleaning nozzle comprising: an ejection nozzle portion having a minimum diameter portion and a trumpet-shaped portion formed by a curved surface located upstream of said minimum diameter portion, an inclination angle of a tangent to the curved surface progressively decreasing toward said minimum diameter portion; a gas ejection port formed along the curved surface and opened to an intermediate part of said trumpet-shaped portion; and a cleaning liquid ejection port formed inside said gas ejection port; whereby a gas is ejected from said gas ejection port at a speed

higher than that of a cleaning liquid from said cleaning liquid ejection port to transform the cleaning liquid into droplets and to accelerate them,

wherein a cross-sectional area of said gas ejection port at its downstream open end is set almost equal to or slightly smaller than that of said minimum diameter portion.

12. (Currently Amended) ~~A cleaning nozzle according to claim 8~~ A cleaning nozzle comprising: an ejection nozzle portion having a minimum diameter portion and a trumpet-shaped portion formed by a curved surface located upstream of said minimum diameter portion, an inclination angle of a tangent to the curved surface progressively decreasing toward said minimum diameter portion; a gas ejection port formed along the curved surface and opened to an intermediate part of said trumpet-shaped portion; and a cleaning liquid ejection port formed inside said gas ejection port; whereby a gas is ejected from said gas ejection port at a speed higher than that of a cleaning liquid from said cleaning liquid ejection port to transform the cleaning liquid into droplets and to accelerate them,

wherein a ratio between a cross-sectional area of said gas ejection port at its downstream open end and a cross-sectional area of the minimum diameter portion is set to 1:1 to 1:1.3.

13. (Original) A cleaning nozzle according to claim 8, wherein a distance from said cleaning liquid ejection port to a downstream end of said ejection nozzle portion is 10-50 times a diameter of said minimum diameter portion.

14. (Original) A cleaning nozzle according to claim 8, wherein a powder material can be supplied to an upstream side of said gas ejection port.

15. (Currently Amended) A cleaning nozzle comprising:
a converging-diverging nozzle portion having a minimum diameter portion and a trumpet-shaped portion formed upstream of said minimum diameter portion;
a gas ejection port formed along said trumpet-shaped portion and opened into an intermediate part of said trumpet-shaped portion; and
a cleaning liquid ejection port formed inside said gas ejection port;
whereby a gas is ejected at a higher speed than that of a cleaning liquid to transform the cleaning liquid into droplets and the droplets are further accelerated downstream of these ejection ports before being ejected out from the cleaning nozzle,
wherein a tapered portion is formed on an outer surface of the cleaning liquid ejection port.

16. (Original) A cleaning nozzle according to claim 15, wherein a gas jet flow passing through a central part of said gas ejection port converges at a point upstream of said minimum diameter portion.

17. (Original) A cleaning nozzle according to claim 15, wherein a cross-sectional area of said gas ejection port perpendicular to a direction of its axis is progressively reduced toward its downstream open end to accelerate the gas.

18. (Previously Presented) A cleaning nozzle comprising:
a converging-diverging nozzle portion having a minimum diameter portion and a trumpet-shaped portion formed upstream of said minimum diameter portion;
a gas ejection port formed along said trumpet-shaped portion and opened into an intermediate part of said trumpet-shaped portion; and
a cleaning liquid ejection port formed inside said gas ejection port;
whereby a gas is ejected at a higher speed than that of a cleaning liquid to transform the cleaning liquid into droplets and the droplets are further accelerated downstream of these ejection ports before being ejected out from the cleaning nozzle,

wherein a cross-sectional area of said gas ejection port at its downstream open end is set almost equal to or slightly smaller than that of said minimum diameter portion.

19. (Previously Presented) A cleaning nozzle comprising:

a converging-diverging nozzle portion having a minimum diameter portion and a trumpet-shaped portion formed upstream of said minimum diameter portion;

a gas ejection port formed along said trumpet-shaped portion and opened into an intermediate part of said trumpet-shaped portion; and

a cleaning liquid ejection port formed inside said gas ejection port;

whereby a gas is ejected at a higher speed than that of a cleaning liquid to transform the cleaning liquid into droplets and the droplets are further accelerated downstream of these ejection ports before being ejected out from the cleaning nozzle,

wherein a ratio between a cross-sectional area of said gas ejection port at its downstream open end and a cross-sectional area of the minimum diameter portion is set to 1:1 to 1:1.3.

20. (Original) A cleaning nozzle according to claim 15, wherein a distance from said cleaning liquid ejection port to a downstream end of said ejection nozzle portion is 10-50 times a diameter of said minimum diameter portion.

21. (Original) A cleaning nozzle according to claim 15, wherein a powder material can be supplied to an upstream side of said gas ejection port.

Claims 22-26 (Cancelled)

27. (Previously Presented) A cleaning nozzle according to claim 1, wherein a pressurized gas flow passage feeds into the cleaning nozzle for allowing a small amount of clogging prevention liquid to be injected into an intermediate section of the pressurized gas flow passage between a powder injection portion and the cleaning nozzle.

28. (Previously Presented) A cleaning nozzle according to claim 15, wherein a pressurized gas flow passage feeds into the cleaning nozzle for allowing a small amount of clogging prevention liquid to be injected into an intermediate section of the pressurized gas flow passage between a powder injection portion and the cleaning nozzle.

29. (Previously Presented) A cleaning nozzle according to claim 1, wherein the amount of the clogging prevention liquid is smaller than that of liquid supplied to the cleaning nozzle.

30. (Previously Presented) A cleaning nozzle according to claim 15, wherein the amount of the clogging prevention liquid is smaller than that of liquid supplied to the cleaning nozzle.

31. (Previously Presented) A cleaning nozzle according to claim 1, wherein the amount of the clogging prevention liquid is smaller by weight than that of the powder injected.

32. (Previously Presented) A cleaning nozzle according to claim 15, wherein the amount of the clogging prevention liquid is smaller by weight than that of the powder injected.

33. (Previously Presented) A cleaning nozzle according to claim 1, wherein the amount of the cleaning prevention liquid is smaller by volume than 1/1000 that of the pressurized gas flow.

34. (Previously Presented) A cleaning nozzle according to claim 15, wherein the amount of the cleaning prevention liquid is smaller by volume than 1/1000 that of the pressurized gas flow.

35. (Previously Presented) A cleaning nozzle according to claim 1, wherein the clogging prevention liquid is made to continue to be injected for a predetermined period after the injection of powder into the pressurized gas flow has stopped.

36. (Previously Presented) A cleaning nozzle according to claim 15, wherein the clogging prevention liquid is made to continue to be injected for a predetermined period after the injection of powder into the pressurized gas flow has stopped.

37. (Previously Presented) A cleaning nozzle according to claim 1, wherein the inclined portions of the trumpet-shaped portion are inclined in the axial direction of the nozzle.

38. (Previously Presented) A cleaning nozzle according to claim 8, wherein the curved surface of the trumpet-shaped portion is curved in the axial direction of the nozzle.

39. (Previously Presented) A cleaning nozzle according to claim 15, wherein the converging-diverging nozzle portion has a converging-diverging shape in the axial direction of the nozzle.

Amendment Under 37 C.F.R. § 1.116
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40. (Cancelled)

41. (Cancelled)